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ILLEGAL ACTS COMMITTED BY ADOLESCENTS UNDER THE INFLUENCE OF ALCOHOL AND DRUGS

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This study examined the proximal effects of alcohol and drug use on adolescent illegal activity. Four years of longitudinal data from the Pittsburgh Youth Study were analyzed for 506 local male adolescents. Participants reported committing offenses against persons more often than general theft under the influence of alcohol or drugs. Aggressive acts were more often related to self-reported acute alcohol use than to marijuana use. Those who reported committing illegal acts under the influence reported committing offenses with other people and being arrested more often than those who did not. Offenses under the influence were more prevalent among heavier alcohol and drug users, more serious offenders, more impulsive youth, and youth with more deviant peers. There were no significant interaction effects of alcohol and drug use with impulsivity or deviant peers in predicting whether illegal acts were committed under the influence. The association between drug use and illegal activity during adolescence is complex.

Although several recent studies have examined the developmental or long-term associations between drug use and delinquency in adolescence (e.g., Huang et al. 2000; Kaplan and Damphousse 1995; White and Hansell 1996, 1998; White et al. 1999), few studies of adolescents have focused on the acute or proximal associations. Furthermore, those studies that have examined these associations have had mixed results (Altschuler and Brounstein 1991; Hartstone and Hansen 1984; Huizinga, Menard, and Elliott 1989; Tinklenberg et al. 1981). The purpose of this study was to examine the proxi-

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mal effects of alcohol and drug use on adolescent illegal activity using longitudinal data from a large community sample of male adolescents.

Laboratory studies of adults shed some light on this issue. These studies have found that acute intoxication by alcohol (below sedating levels) is related to aggression when an individual is provoked (Bushman, 1997; Lipsey et al. 1997). This increased aggression under conditions of alcohol intoxication in the laboratory is best explained by the fact that alcohol causes changes within a person that increase the risk for aggression, such as reduced intellectual functioning, reduced self-awareness, selective disinhibition, and the inaccurate assessment of risks (Chermack and Giancola 1997; Ito, Miller, and Pollock 1996; Parker and Auerhahn 1998). These same alcohol-induced changes may put a person at risk for nonaggressive crimes, although less research and theorizing have been applied to psychopharmacological explanations for property crime (Goldstein 1985; White and Gorman 2000). In contrast, laboratory studies indicate that marijuana has the opposite effect of alcohol in that moderate doses temporarily inhibit aggression and violence (Meyerscough and Taylor 1985; Miczek et al. 1994).

In addition to experimental research, statistics on the rates of alcohol use by adult offenders at the time of an offense provide strong support for the alcohol-violence relationship (Collins and Messerschmidt 1993; Roizen 1993). In one study, however, although more than 50 percent of the assaultive offenders reported drinking at the time of their offenses, 59 percent of those drinking did not think that their drinking was relevant to the commission of their crimes (Collins and Messerschmidt 1993). In a study of incarcerated offenders, Collins and Schlenger (1988) concluded that acute episodes rather than chronic patterns of alcohol use better predict violent offending. High percentages of jail inmates have also reported being under the influence of drugs, primarily marijuana and cocaine, at the time of their offenses (Harlow 1998). However, reports from adult offenders indicate that more violent crime than property crime is committed under the influence of alcohol alone, and more property crime than violent crime is committed under the influence of drugs alone (Franklin, Allison, and Sutton 1992; Harlow 1998; Miller and Welte 1986). Valdez, Yin, and Kaplan (1997) also found that arrests for aggressive crimes were more strongly related to reports of frequent alcohol use than to testing positive for illicit drugs. In fact, persons who tested positive compared to negative for illicit drugs were less likely to be involved in aggressive crime. Therefore, laboratory and epidemiological research on adults underscores the facts that alcohol use compared to most illicit drug use is more strongly related to aggressive crime and that drug use may be more related to property crime.

The stronger association between drug use and property crime may reflect economic necessity (White and Gorman 2000). The economic motivation

model, which is an alternative perspective to the psychopharmacological model, assumes that drug users need to generate illicit income to support their drug habits (Goldstein 1985). Support for this model comes from the literature on heroin addicts, which indicates that increases or decreases in the frequency of substance use among addicts raise or lower their frequency of crime, especially property crime (e.g., Anglin and Perrochet 1998; Chaiken and Chaiken 1990; Nurco et al. 1984). In contrast, self-report data do not provide strong support for an economic motivation model (White and Gorman 2000). Intensive drug users and highly delinquent youth do not report committing illegal acts to raise money for drugs, and most report committing illegal acts for reasons completely independent of drugs (Altschuler and Brounstein 1991; Carpenter et al. 1988; Johnson et al. 1986). In fact, much of the recent research dispels the assumption of economically motivated offending, once drug dealing is excluded (White and Gorman 2000).

Research examining the acute effects of various drugs and their relationships with different types of illegal activity is more inconsistent for adolescents than for adults. Reports from arrested adolescents indicate a much greater overlap in the use of alcohol and drugs and less of a distinction between them in their associations with different types of offenses (Bureau of Justice Statistics 1994; White 1997b). For example, in one study of adolescents who were adjudicated for violent offenses, almost half had used either alcohol or drugs immediately prior to committing their offenses (Hartstone and Hansen 1984). In this study, rates were somewhat higher for other drugs than for alcohol. In contrast, in a study of incarcerated adolescents, it was found that the acute use of alcohol either alone or in combination with other drugs was involved in more than half of the incidents of physical assault, whereas the acute use of marijuana was involved in about one fourth of such incidents (Tinklenberg et al. 1981). The researchers concluded that marijuana use was underreported in physical assault offenses in comparison to alcohol relative to their reported frequency of use in the sample. The findings for sexual assault were similar.

The few community studies of adolescents that have attempted to address this issue provide mixed support for a proximal association between alcohol and/or drug use and delinquency (Carpenter et al. 1988; Huizinga et al. 1989; White 1997b). For example, Carpenter et al. (1988) interviewed adolescents about their use of alcohol and drugs immediately preceding offenses. Many adolescents reported that they actually moderated their use when they knew they were going to commit illegal acts. In a study of inner-city ninth graders, Altschuler and Brounstein (1991) found that only a minority of youth used drugs before committing any type of illegal act.

Huizinga et al. (1989), in a national study of adolescents, reported higher rates of acute alcohol use than drug use for all index offenses except robbery,

for which the rates were equal for both substances. As these participants aged, the distinctions between using alcohol and drugs became much clearer. All categories of offenses were more strongly related to alcohol use except motor vehicle theft, which was strongly related to drug use. Overall, the association between alcohol use and violent offenses was stronger in young adulthood than in adolescence, suggesting that the nature of the relationship may change over the life course (see also Collins 1986). In these analyses, the researchers did not control for drug use, so the differences could partly reflect the fact that alcohol use was the most prevalent substance used. However, Huizinga et al. (1989) also compared the average percentage of days when alcohol and drugs were used to the percentage of offenses committed under the influence of alcohol and drugs. They found a very strong association between alcohol use and sexual assaults. For the remaining offenses, the estimated daily use of alcohol exceeded (or was equal to for aggravated assaults) the rate at which alcohol was used prior to offense commission. Further, the use of drugs prior to offense commission was much lower than expected on the basis of average daily use. White and Hansell (1998) controlled for the prevalence of drug use in their analyses and found that alcohol was more strongly related to fighting than was marijuana. The strength of the relationship between alcohol and fighting relative to marijuana and fighting increased with age.

Overall, the extant research on acute intoxication and delinquency for adolescents is limited (Huizinga et al. 1989). Samples have been primarily restricted to arrestees and adjudicated delinquents, whose use patterns may not be generalizable to all adolescents. These youth may report drug use simply to give themselves an excuse for their illegal behavior (Collins 1993). As well, individuals who use alcohol or drugs when committing illegal acts may be more likely to get caught (Chaiken and Chaiken 1990; Collins 1986). Few community samples of adolescents have been assessed in terms of their drug use prior to offense commission. Those studies that have made such assessments have been limited to only a few offenses and/or have not controlled for the type or extent of typical drug use within the analyses. That is, if delinquents are also frequent drug users, they are probably using drugs often both when they commit illegal acts and when they do not, and their drug use may be superfluous to their offense commission (White 1990). In addition, none of these studies has attempted to understand the possible mechanisms that account for these relationships.

One possible explanation for the association between acute alcohol and drug use and illegal activity is the psychopharmacological effects of drugs. Psychopharmacological effects of alcohol that have been postulated to increase the risks for delinquency include impairment in communication, which involves provoking others and being easily angered; increased risk

taking; an unawareness of the consequences of one's own behavior; and expectancies that alcohol use causes aggression (Bushman 1997; Chermack and Giancola 1996; Ito et al. 1996; Parker and Auerhahn 1998; White 1997a, 1997b). An alternative explanation may be that the use of drugs is a social activity, and thus, while using drugs, adolescents may be in the company of peers who encourage or reinforce illegal behavior (Fagan 1993; White 1990). In addition, drug use may interact with an individual's personality or temperament characteristics, such as impulsivity and hyperactivity, to increase the risk for offense commission (Lang 1993). One needs to be aware, however, that different drugs may have different moderating effects. For example, alcohol or sedative drugs may interact with temperament characteristics to increase aggression, whereas drugs such as marijuana may actually have inhibiting effects on aggression (Miczek et al. 1994).

This study examined the self-reported proximal associations between drug use and illegal activity during adolescence and explanations for these associations. It extended prior research on adolescents by including a large number of types of illegal activities, controlling for individuals' drug use in the analyses, and examining potential mechanisms that might account for a proximal association. We addressed the following questions, which have not been adequately addressed in community studies of adolescents to date: (a) Is there a difference in the types of illegal acts that are committed under the influence of alcohol and those committed under the influence of drugs? (b) Is there a difference in the rates of illegal acts committed under the influence of alcohol and those committed under the influence of marijuana? (c) Is there a relationship between using alcohol and drugs and being with others at the time of an offense? (d) Does the extent of drug involvement or the extent of offending involvement affect the likelihood of committing illegal acts under the influence of drugs? (e) Are those who commit illegal acts under the influence of drugs more likely to get arrested? and (f) Are these relationships moderated by individual hyperactivity and/or impulsivity or type of peer group?

METHOD

Design and Sample

Data were collected as part of the Pittsburgh Youth Study (PYS). The PYS is a prospective longitudinal study of the development of delinquency, substance use, and mental health problems (Loeber et al. 1998). In 1987 and 1988, random samples of first-, fourth-, and seventh-grade boys enrolled in the city of Pittsburgh's public schools were selected. Approximately 850 boys in each grade (85 percent of the target sample) were screened. About

500 boys in each grade (the 250 most antisocial and another 250 randomly selected from those remaining) were chosen for the first follow-up six months later. For the present analyses, we used only the oldest cohort ($N = 506$) because of low rates of drug use in the younger cohorts (White et al. 1999). After the first follow-up, subjects in the oldest cohort were subsequently followed up at six-month intervals for four additional assessments and then at yearly intervals for another four assessments. Attrition has remained relatively low, and 89.7 percent of the original sample was followed up at the last assessment.

For the present study, we concentrated on the last four yearly assessments because the measures of alcohol and drug use at the time of offense commission were not available prior to that. The sample was approximately 16.5 years old in the first of these four assessments ($M = 16.33$, $SD = 0.80$) and 19.5 years old at the end. Most of the analyses combined data from all four years to create a single indicator for each variable of interest. The sample was 57.5 percent African American, with the remainder almost entirely White. In addition, 36.2 percent of the boys' families received public assistance or food stamps. (For greater detail on participant selection and sample characteristics, see Loeber et al. 1998).

For these analyses we only include adolescents who had used alcohol (beer, wine, or hard liquor), marijuana, and/or other drugs (hallucinogens, cocaine, crack, heroin, PCP, and the nonmedical use of tranquilizers, barbiturates, codeine, amphetamines, and over-the-counter medications) at least once during the four-year period (i.e., at any time during the period from approximate 16.5 through 19.5 years of age). As stated earlier, it would not make sense to assess offenses committed under the influence of drugs for individuals who never used alcohol or drugs. This limited our analysis to 454 of the 506 subjects (89.7 percent).

Measures

All of the measures came from self-reports from the adolescents except for the serious offender classification scale and the measure of hyperactivity and/or impulsivity (see below). Self-reports are generally accepted as reliable and valid indicators of delinquent behavior and drug use (Farrington et al. 1996; Hindelang, Hirschi, and Weis 1981; Single, Kandel, and Johnson 1975). According to Elliott, Huizinga, and Menard (1989), self-reports provide a more direct, sensitive, and complete measure of various forms of deviant behavior than measures based on official law enforcement and institutional records. Self-reports also have their limitations in terms of the accuracy of recall, misunderstanding the questions, and efforts to conceal or exaggerate (Chaiken and Chaiken 1990). When both the dependent and

independent measures are assessed with self-reports, there is also a potential influence of shared method variance. Therefore, the results of this study should be evaluated in light of possible measurement limitations. (For greater detail on the advantages and disadvantages of self-report data, see Elliott et al. 1989; Farrington et al. 1996; Hindelang et al. 1981.)

*Illegal activities.*¹ We examined the frequency (number of times) of commission of 19 different types of illegal acts within the past year. These behaviors were divided into general theft (i.e., theft at four levels ranging from less than \$5 to more than \$100, shoplifting, breaking and entering, auto theft, joy-riding, and stealing from cars), offenses against persons (i.e., attacking, hitting to hurt, gang fighting, strong-arming, and throwing objects at people), and miscellaneous offenses (i.e., setting fires, vandalism, credit card fraud, fencing, and check forgery) (Huizinga et al., 1989). We were primarily interested in the prevalence of each of these behaviors in any of the four years (between 16.5 and 19.5 years of age).

We also controlled for the level of serious offending by using a serious and violent offending classification scale, which is a Guttman scale that reflects the most serious offending in the past year and is based on reports from the child, parent or guardian, and teacher (Loeber et al. 1998). Serious offenders (i.e., those who engaged in breaking and entering, auto theft, prostitution, attacking with a weapon, strong-arming, hurting for sex, or forced sex) were compared to minor and moderate offenders.

Illegal acts committed under the influence. For each type of illegal act that an adolescent committed, he was asked whether he used alcohol or drugs at the time he committed the most serious occasion of that offense within the past year. Note that this measure did not assess drug use at the time of committing every illegal activity, only the most serious of each type. Thus, this measure could have underestimated the extent of acute drug involvement if alcohol or drugs were used on less serious occasions. Also note that the question did not distinguish between alcohol and other drugs.

Distinguishing between alcohol-related and marijuana-related illegal acts. Although the previous questions about illegal activities could not distinguish between alcohol and other drugs, there were a few questions about illegal acts that were asked separately for alcohol and for marijuana and included in these analyses. Adolescents were asked how often in the past year they got into fights and got in trouble with the police while using alcohol and while using marijuana. For these questions, only those adolescents who used alcohol ($n = 445$) were included for the two alcohol items, and those who used marijuana ($n = 264$) were included for the marijuana items.

Illegal acts committed alone or with others. The same question that asked about using alcohol and drugs while committing the most serious offense also asked about whether adolescents were alone or with others when they committed the most serious offenses for each act.

Drug use measures. Frequency of alcohol use was the sum of the number of times participants used beer, wine, or hard liquor during the past year. Adolescents who used alcohol were divided into the highest quartile versus the lower three in each of the four years. Anyone who was in the highest quartile in at least one of the four years was considered a heavy alcohol user. We constructed the same measures for marijuana use.

Arrests. Each year, participants reported the number of times that they were arrested within the past year. We dichotomized this variable into those ever arrested versus those never arrested during the four-year period. Note that this variable could not be matched with each individual type of offense committed under the influence.

Hyperactivity, impulsivity, and attention problems. At ages 16.5 and 17.5, primary caretakers and teachers completed the Achenbach Child Behavioral Checklist (Achenbach and Edelbrock 1983; Edelbrock and Achenbach 1984). Fourteen items assessing hyperactivity, impulsivity, and attention problems (e.g., is impulsive or acts without thinking, behaves irresponsibly, is inattentive, is daring) were combined to form a composite scale that measured hyperactivity, impulsivity, and attention problems (hereafter referred to as impulsivity). We took the maximum value for the two years for this analysis, and for some analyses, we divided adolescents into the top quartile versus the lower three.

Peer deviance. Each year, participants reported the number of close friends who had committed 11 illegal acts ranging from lying and vandalism to strong-arming and attacking individuals. We took the maximum number for the four years (from 16.5 to 19.5 years of age) for this variable, and for some analyses, we divided adolescents into the top quartile versus the lower three.

RESULTS

Are There Differences by Type of Illegal Act?

Table 1 shows the percentage of the most serious of each illegal act reported to have been committed under the influence of alcohol and/or drugs. These

TABLE 1: Percentage Committing Each Type of Illegal Act under the Influence (N = 454)

<i>Act</i>	<i>n</i>	<i>Percentage under the Influence</i>
Theft of <\$5	63	15.9
Theft of \$5 to \$50	36	17.9
Theft of \$50 to \$100	24	26.3
Theft of >\$100	59	28.8
Stealing from cars	50	20.7
Auto theft	40	32.5
Joyriding	90	26.7
Shoplifting	90	18.9
Breaking and entering	27	22.2
Vandalism	104	35.6
Gang fighting	97	42.3
Attacking	97	37.1
Hitting to hurt	222	29.3
Throwing	100	34.0
Strong-arming	24	45.8
Setting fires	18	16.7
Fencing	125	12.8
Check forgery	14	0
Credit card fraud	14	7.1
Offenses against persons	279	39.8
General theft	147	23.1

percentages reflect the percentage of those who reported committing each offense, which could be as few as 14 subjects for credit card fraud and as many as 222 for hitting to hurt. (In fact, five offenses were committed by less than 10 percent of the sample.)

The percentages under the influence ranged from 0 percent for forging checks to 45.8 percent for strong-arming. Proportionally, the most frequent illegal acts reported to have been committed under the influence of alcohol or drugs were strong-arming, gang fighting, attacking, vandalism, and throwing things at others. For each of these, more than one third of those who committed the offense committed their most serious offenses under the influence of alcohol or drugs. Most of these activities would be considered aggressive, and thus, these data suggest that violent offenses as opposed to property offenses may be more strongly related to acute incidents of alcohol and drug use.

The least likely offenses to have been committed under the influence were white-collar offenses such as check forgery, credit card fraud, and fencing. We also examined these associations for alcohol users only to be sure that the illegal act involved only alcohol use and not other drugs. The findings were very similar, suggesting that many of the offenses committed under the influence, as shown in Table 1, were probably committed under the influence of

alcohol rather than other drugs. (These data are not presented here but are available from the first author by request.)

The final two lines in Table 1 summarize the difference between offenses against persons and general theft. Almost twice as many boys were ever involved in an offense against a person than were involved in a property offense.² Of those who committed offenses against persons, 39.8 percent reported that they were under the influence of alcohol or drugs when they committed their most serious of at least one type of personal offense. In contrast, only 23.1 percent reported that they were under the influence for their most serious occasion of any theft offense. Therefore, in answer to our first question, offenses against persons, compared to general theft, were more often reported to have been committed under the influence of alcohol and drugs.

Is There a Difference between Alcohol and Marijuana?

If there is credence to the psychopharmacological explanation for the acute association between alcohol and drug use and offending, then there should be a stronger relationship between acute alcohol use and illegal activity than between marijuana use and illegal activity. Among those who used each substance, 23.1 percent of the alcohol users got into fights, and 17.5 percent got into trouble with the police while using alcohol, whereas 6.1 percent of the marijuana users got into fights and 10.2 percent got into trouble with the police while using marijuana. Therefore, more adolescents reported an association of alcohol than marijuana to fighting behavior, which corroborates the findings of experimental studies (White 1997a).

Is There a Difference between Being Alone and Being with Others?

The third question we addressed was whether those who committed offenses under the influence, compared to those who did not, would be more likely to have committed their offenses with other people. As is commonly found in delinquency research, most adolescents committed offenses with others. This ranged from a low of 62 percent for strong-arming to a high of 93 percent for breaking and entering. For 12 of the 18 illegal acts that were examined, more than 75 percent of those committing a given offense did so with someone else.³ (These data are not shown but are available from the first author by request.)

Table 2 presents the rates of committing personal and property offenses with others while under the influence and while not under the influence of alcohol or drugs. The rates for those under the influence are shown in the first column, the rates for those not under the influence are shown in the second

TABLE 2: Percentage Committing Illegal Acts with Others (N = 454)

<i>Act</i>	<i>Those under the Influence</i>	<i>Those Not under the Influence</i>	<i>Total</i>
Against persons	90.8	74.6***	85.8
General theft	88.6	73.7	77.6

*** $p < .001$ as determined by a chi-square analysis.

column, and the rates for the total sample are shown in the third column. Participants reported that they were more likely to commit their most serious personal offenses than their most serious property offenses with others.

There was a significant association between self-reports of being under the influence of alcohol and/or drugs and committing personal offenses with other people: Of those under the influence, 90.8 percent committed personal offenses with others, whereas 74.6 percent of those not under the influence committed personal offenses with others (odds ratio [OR] = 3.4, $p < .001$). This relationship was not significant for property offenses, although the differences were almost as large as for personal offenses: 88.6 percent versus 73.7 percent (OR = 2.8, $p > .05$).

Given that illegal activity is often a peer group behavior, as is drug use, the overlap may reflect circumstantial effects. The results may also reflect group psychopharmacological effects; that is, as those in a group get high together, they motivate one another to commit illegal acts. It is also possible that youth plan to get high together intentionally to give themselves the courage or an excuse to engage in illegal acts, especially aggressive offenses (Fagan 1993). Unfortunately, the data do not allow us to disentangle these effects.

Are There Differences Depending on Drug Use Patterns?

One explanation for the strong association between acute drug use and illegal activity is that those who use drugs often use them all the time, whether or not they commit illegal offenses. In other words, frequent drug users will be more likely to be under the influence simply by chance. Therefore, the pattern of usage is a confounding factor, and we examined the association between frequent drug use and committing offenses under the influence. For these analyses, we divided adolescents into heavy users (the top 25 percent) and light users (the remaining 75 percent). The results are shown in Table 3. As found in previous research (White and Gorman 2000), heavy versus light alcohol users were significantly more likely to commit both personal (OR = 6.2, $p < .001$) and property (OR = 5.2, $p < .01$) offenses under the influence. Note that 54.6 percent of the heavy alcohol users committed violent offenses under the influence, and only 29.5 percent committed property offenses

TABLE 3: Percentage Committing Illegal Acts under the Influence by Level of Drug Use and Serious Offender Classification

Act	Alcohol Use		Marijuana Use		Type of Offender	
	High	Low	High	Low	Serious	Nonserious
Against persons ^a	54.6	16.2***	54.1	43.5	57.7	29.4***
General theft ^b	29.5	7.5**	30.0	22.2	29.6	13.6*
Fight alcohol ^c	35.8	8.3***	nt	nt	45.1	17.0***
Fight marijuana ^d	nt	nt	8.6	2.6*	10.6	2.5*
Police alcohol ^c	25.0	8.8***	nt	nt	33.8	13.9***
Police marijuana ^d	nt	nt	15.9	2.6***	12.4	10.8

NOTE: nt = not tested.

a. Based only on those who had committed offenses against persons ($n = 279$).

b. Based only on those who had committed general theft offenses ($n = 147$).

c. Based only on alcohol users ($n = 445$).

d. Based only on marijuana users ($n = 264$).

* $p < .05$, ** $p < .01$, and *** $p < .001$ as determined by a chi-square analysis.

under the influence. Thus, these data for heavy alcohol users support the earlier findings for all users showing a stronger relationship with personal offenses than with theft offenses for those under the influence.

On the other hand, heavy versus light marijuana users were not significantly more likely to commit either type of offense under the influence of alcohol or drugs ($OR = 1.5$, $p > .05$ for personal; $OR = 1.5$, $p > .05$ for theft). Thus, the extent of marijuana use was not related to committing offenses under the influence of alcohol or drugs. Note, however, that the rates of committing offenses under the influence were relatively high for both heavy and light marijuana users. These high rates probably reflect the fact that marijuana users were also heavy alcohol users and committed these offenses under the influence of alcohol rather than marijuana.

The results also show that heavy alcohol users were more likely to report getting into fights ($OR = 6.2$, $p < .001$) and into trouble with the police ($OR = 3.5$, $p < .001$) while using alcohol and that heavy marijuana users were more likely to report getting into fights ($OR = 3.5$, $p < .05$) and into trouble with the police ($OR = 6.9$, $p < .001$) while using marijuana. Thus, when only marijuana-related offenses are considered, the frequency of marijuana use appears to make a difference.

Is There a Difference between Serious and Nonserious Offenders?

We were also interested in whether serious offenders were more likely to commit offenses under the influence. These results are also presented in Table 3. Serious offenders, compared to minor and moderate offenders, were more than twice as likely to commit both violent ($OR = 3.3$, $p < .001$) and

TABLE 4: Percentage Ever Arrested among Those Committing Illegal Acts under the Influence and Those Not under the Influence

<i>Act</i>	<i>Under the Influence</i>	<i>Not under the Influence</i>
Against persons ^a	78.4	47.0***
General theft ^b	88.2	62.8**
Fight alcohol ^c	74.7	39.8***
Fight marijuana ^d	87.5	63.7
Police alcohol ^c	83.8	40.3***
Police marijuana ^d	92.6	62.0**

a. Based only on those who had committed offenses against persons ($n = 279$).

b. Based only on those who had committed general theft offenses ($n = 147$).

c. Based only on alcohol users ($n = 445$).

d. Based only on marijuana users ($n = 264$).

** $p < .01$ and *** $p < .001$ as determined by a chi-square analysis.

property ($OR = 2.7, p < .05$) offenses under the influence of alcohol and/or drugs. Note that these analyses were limited to only those who used drugs, so the fact that drug use is more prevalent among serious offenders was held constant, although the analysis did not control for the fact that serious offenders may be more frequent users. Serious offenders, compared to nonserious offenders, were also significantly more likely to report getting into fights while using alcohol ($OR = 4.0, p < .001$) and marijuana ($OR = 4.6, p < .001$) and getting into trouble with the police while using alcohol ($OR = 3.2, p < .001$) but not marijuana (10.8 percent, $OR = 1.2, p > .05$).

Are Those Who Commit Illegal Acts under the Influence More Likely to Get Arrested?

As mentioned earlier, we could not match arrests with specific illegal acts committed under the influence. Instead, Table 4 shows the percentage of youth who reported getting arrested among those who reported committing offenses under the influence and those who did not. Those individuals who committed both property ($OR = 4.4, p < .01$) and personal ($OR = 4.1, p < .001$) offenses under the influence of alcohol or drugs were at much higher risk for having ever been arrested compared to those who did not commit these offenses under the influence. As well, a much larger percentage of those who fought under the influence of alcohol ($OR = 4.5, p < .001$) and got into trouble with the police because of alcohol ($OR = 7.4, p < .001$) or marijuana ($OR = 7.7, p < .01$) had been arrested. The difference in arrest rates for those who fought versus those who did not fight under the influence of marijuana ($OR = 4.0, p > .05$) was not significant.

Given the nature of the data, we cannot conclude that the use of drugs contributed to the arrests. These differences could reflect the fact that some

TABLE 5: Percentage Committing Illegal Acts under the Influence by Level of Impulsivity and Proportion of Deviant Peers

Act	Impulsivity		Deviant Peers	
	High	Low	Many	Few
Against persons ^a	51.3	34.3*	56.2	30.9***
General theft ^b	32.5	20.0	37.9	13.5***
Fight alcohol ^c	33.0	19.7**	43.2	16.6***
Fight marijuana ^d	5.9	6.4	11.6	3.4**
Police alcohol ^c	27.0	14.2**	32.4	12.7***
Police marijuana ^d	10.3	11.0	10.5	10.2

a. Based only on those who had committed offenses against persons ($n = 279$).

b. Based only on those who had committed general theft offenses ($n = 147$).

c. Based only on alcohol users ($n = 445$).

d. Based only on marijuana users ($n = 264$).

* $p < .05$, ** $p < .01$, and *** $p < .001$ as determined by a chi-square analysis.

individuals were careless in the commission of their illegal acts because they were intoxicated. Alternatively, the differences might simply reflect the fact that arrestees are more frequent drug users.

Do Deviant Peers and Levels of Impulsivity Moderate the Effects of Drug Use on Illegal Activity?

To understand more about the mechanisms that might account for the association between acute alcohol and drug use and illegal activity during adolescence, we examined the moderating effects of impulsivity and deviant peers on committing offenses under the influence. First, we examined whether those high in impulsivity, compared to those low in impulsivity, were more likely to engage in illegal activity under the influence (see Table 5). Impulsivity was significantly related to offenses against persons ($OR = 2.0, p < .05$) but not to theft ($OR = 1.9, p > .05$). It was also significantly related to fighting ($OR = 2.0, p < .01$) and getting into trouble with the police ($OR = 2.2, p < .01$) while using alcohol, but not while using marijuana ($OR = 0.9, p > .05$ for fighting; $OR = 0.9, p > .05$ for trouble with the police). Thus, impulsivity, alcohol, and violence appear to be interconnected.

Table 5 also shows the effects of deviant peers. Those boys with larger proportions of deviant peers were more likely to commit both personal ($OR = 2.9, p < .001$) and theft ($OR = 3.9, p < .001$) offenses while under the influence. They were also more likely to fight while under the influence of alcohol ($OR = 3.8, p < .001$) and marijuana ($OR = 3.7, p < .01$) and to get into trouble with the police while using alcohol ($OR = 3.3, p < .001$) but not marijuana ($OR = 1.0, p > .05$). Again, this strong relationship could be indicative of the

fact that drug use and offending are peer group activities, and thus, there is a circumstantial association, and/or that those boys with more deviant peers are also heavier alcohol and marijuana users.

For the moderation analyses, we conducted hierarchical logistic regression analyses to test whether heavy alcohol and marijuana use, deviant peers, impulsivity, and their interactions predicted committing offenses under the influence of drugs. For these analyses, we dichotomized the predictors into the top quartile versus the rest. The odds ratios are shown in Table 6. All of the main effects variables were significant predictors of committing personal offenses while under the influence of alcohol and/or drugs, even when the other variables were held constant. Only frequent marijuana use and having many deviant peers were significant predictors of being under the influence when committing a theft. (Note that when the analyses were conducted separately for alcohol and marijuana, the findings remained the same. The results are available from the first author by request.) None of the interactions were significant. However, we were able to model only the interaction between the frequency of use with deviant peers and with impulsivity, not necessarily the interactions between acute use and these two variables.

We also tested these same models for alcohol users only and for marijuana users only using fights and trouble with the police while under the influence as the outcome variable (see Table 6). We found that frequent alcohol use and having many deviant peers significantly predicted fighting and getting into trouble with the police while using alcohol. Only frequent marijuana use significantly predicted fighting and getting in trouble with the police while using marijuana. Again, none of the interactions were significant.

DISCUSSION

In sum, the self-report data indicate that offenses against persons, compared to general theft, were more likely to be committed under the influence of alcohol or drugs. Furthermore, aggressive offenses were more often related to acute use of alcohol than marijuana. Those who reported committing offenses under the influence, compared to those who did not, were more likely to report having committed offenses with other people and having been arrested. Committing offenses while under the influence was more prevalent for those who were heavier alcohol and drug users, were more serious offenders, were more impulsive, and had more deviant peers. After controlling for levels of alcohol and drug use, both being more impulsive and having more deviant peers predicted committing personal offenses under the influence, whereas deviant peers but not impulsivity predicted committing general theft

TABLE 6: Odds Ratios from the Logistic Regression Analyses

<i>Predictor</i>	<i>Model</i>					
	<i>Persons under the Influence^a</i>	<i>Theft under the Influence^b</i>	<i>Fight Alcohol^c</i>	<i>Police Alcohol^c</i>	<i>Fight Marijuana^d</i>	<i>Police Marijuana^d</i>
Alcohol frequency	2.8**	1.2	4.1***	2.8***	nt	nt
Marijuana frequency	2.7**	2.5*	nt	nt	5.0*	4.8**
Deviant peers	2.2*	2.9*	2.5***	2.4**	2.2	0.7
Impulsivity	1.9*	1.7	1.5	1.8	0.7	0.8
Chi-square (<i>df</i> = 4)	54.5***	17.5**	65.1***	42.5***	11.4**	12.1**

NOTE: nt = not tested.

a. Based only on those who had committed offenses against persons ($n = 279$).

b. Based only on those who had committed general theft offenses ($n = 147$).

c. Based only on alcohol users ($n = 445$).

d. Based only on marijuana users ($n = 264$).

* $p < .05$. ** $p < .01$. *** $p < .001$.

offenses under the influence. However, there were no significant interaction effects of alcohol and drug use with impulsivity or deviant peers in the prediction of whether offenses were committed under the influence.

Overall, the results of this study of adolescents support prior research on adults and indicate a stronger relationship between the acute use of alcohol and illegal activity than between marijuana use and illegal activity, as well as a stronger relationship of alcohol use to personal offenses than to general theft (Franklin et al. 1992; Harlow 1998; Miller and Welte 1986; Valdez et al. 1997). These differences could reflect either differences in the psychopharmacological effects of alcohol or societal expectancies regarding alcohol use and aggression. Furthermore, individual differences in impulsivity appear to be involved in this complex association between alcohol use and aggressive offending. Note that impulsivity was measured as a broad category including hyperactivity, impulsivity, and attention problems. Future research should examine these and other temperamental traits individually to assess their role in alcohol- and drug-related offending. In addition, more research is needed to understand the situational factors that may condition the associations among impulsivity, alcohol use, and aggression (Fagan 1993).

We could not substantiate a unique relationship between drug use and theft, as has been demonstrated for adults. Miller and Welte (1986) found that adult offenders who used only drugs when they committed their crimes compared to those who used only alcohol or used alcohol and drugs were more likely to have committed property offenses. Because we could not separate out the use of alcohol and marijuana when examining theft offenses committed under the influence, we could not address this issue. The extent of marijuana use was not related to committing general theft or personal offenses under the influence of alcohol or drugs, although among marijuana users, it was related to fighting and getting into trouble with the police while using marijuana. In the logistic regression analyses, frequent marijuana use predicted committing both personal and property offenses under the influence, whereas frequent alcohol use was not related to committing general theft offenses under the influence. Thus, in this sample, marijuana use appears to be related similarly to both general theft and to offenses against persons.

Those youth most involved in drug use and most involved in serious offending were at the greatest risk for being under the influence when they committed illegal acts. We cannot necessarily assume that this relationship is causal, however, because these individuals may have been under the influence of alcohol and/or drugs often, regardless of whether or not they were committing illegal acts (Carpenter et al. 1988; White 1990).

The fact that personal offenses were more likely to be committed with other people when under the influence and were more strongly related to alcohol use than to marijuana use suggests that aggression occurs in social

settings where alcohol is used and that alcohol may be a contributing factor (as a cause or an excuse) (Collins 1993; Fagan 1993). Nevertheless, large majorities of adolescents committed offenses with other individuals regardless of whether they were under the influence or not. Further, having deviant peers predicted committing offenses against persons and theft under the influence even after controls for the youth's own levels of marijuana and alcohol use. Therefore, these data suggest that peer groups may play a significant role in affecting the nature of illegal activities.

This study could not address several questions. First, for most offenses, we could not differentiate whether adolescents were under the influences of alcohol, drugs, or both when committing illegal acts. Even when we could distinguish between alcohol and drugs, we only differentiated between alcohol and marijuana, two drugs with opposite psychopharmacological associations with aggression (at least as assessed under laboratory conditions) (Miczek et al. 1994). Because the prevalence of other drug use was relatively low in this sample, we could not explore associations between other drug use and illegal activity. Future research on other samples should attempt to distinguish among different types of drugs. Second, we had data on only the most serious offenses within each behavior category, and therefore, we missed all other occasions of acute alcohol or drug use when offending. Third, we could not link specific offenses under the influence to being arrested for those offenses. Fourth, we could not assess the interactions between acute drug use (as opposed to frequent drug use) and impulsivity or deviant peers to specify mechanisms more clearly. Also, we did not examine other factors that could condition the associations between acute drug use and offending. For example, there is substantial data to suggest that race, ethnicity, and social class are related to both offending and drug use among adolescents, although not necessarily in the same direction (Elliott 1994; Johnston, O'Malley, and Bachman 2000). Given that more than half this sample was African American, and over one third were at or near the poverty level, the sociodemographic characteristics of this sample may have affected the nature of the observed associations. Therefore, future research should include race, ethnicity, social class, and other potential moderators.

In spite of these limitations, this study is one of the only community studies to collect data from adolescents on the use of alcohol and drugs at the time of commission of numerous types of offenses. Further, in this study, we controlled for drug use so as not to artificially inflate associations between drug use and offending. In addition, we attempted to understand various mechanisms that could account for the associations between drug use and illegal activity.

Overall, the findings indicate a complex association between illegal activity and alcohol and drug use and raise as many questions as they answer. It

appears that one single model cannot explain this relationship for all adolescents. Rather, there are some individuals for whom the acute cognitive effects of some drugs, such as alcohol, increase the propensity toward illegal behaviors, especially violence. For others, deviant behavior may lead to involvement in peer groups that provide opportunities and reinforcement for increased illegal activity and drug use. Finally, for others, shared intrapersonal and environmental factors may increase the risk for involvement in all types of deviant behavior. Harm reduction strategies may help prevent offending for those who commit illegal acts because of the acute effects of alcohol or drugs; changes in peer groups may work for the second group, and prevention programs that focus on individual and environmental risk factors will be indicated for the third group (Loeber, Stouthamer-Loeber, and White 1999; Marlatt 1998). More research is needed to prospectively differentiate these various subgroups to develop appropriate interventions.

NOTES

1. Jurisdiction in the Commonwealth of Pennsylvania changes at age 18. However, for serious offenses, juveniles can be referred to criminal court at an earlier age. Because this study focused on the period from approximately 16.5 through 19.5 years of age, some of the illegal acts reported by adolescents were delinquent offenses, and some were criminal offenses. Therefore, we use the terms *illegal act* and *offense* rather than *delinquency* or *crime* to avoid confusion regarding issues of jurisdiction.

2. The reason for the higher rate of personal offenses in this sample may reflect the fact that a relatively minor violent act, hitting to hurt, was included in the personal offense category and was reported by the greatest number of participants. Nevertheless, the inclusion of this minor violent act does not appear to have influenced the findings for the differences between personal offenses and general theft; more serious personal offenses (e.g., strong-arming and attacking) had higher rates of being committed under the influence than hitting to hurt.

3. The number of acts was reduced from 19 to 18 because gang fighting was left out of this specific analysis.

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